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EXAMINER

KENNEDY, JENNIFER M

ART UNIT PAPER NUMBER

2812

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/053,572

Applicant(s)

OHNUMA, HIDETO

Examiner

Jennifer M. Kennedy

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant is referred to the new ground of rejection given below.

### ***Claim Objections***

Claims 23 and 28 are objected to because of the following informalities: In line 8 of claim 23, and line 8 of claim 28, "channel oxide" should be changed to --chemical oxide--. Appropriate correction is required.

### ***Information Disclosure Statement***

The information disclosure statement filed 3/28/2002 fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. It has been placed in the application file, but the information referred to therein has not been considered. The examiner noted that the reference along with a letter discussing the submission of the IDS, however the case did not contain a 1449 form listing the references.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (U.S. Patent Appl 2002/0098635) in view of Ohtani et al. (U.S. Patent No. 5,966,596).

Zhang et al. discloses the method of forming a semiconductor film comprising silicon (31), specifically amorphous silicon, over an insulating substrate (1), forming a oxide film (33) on a surface of the semiconductor film comprising silicon as a pretreatment, and doping the semiconductor film comprising silicon with impurity ions after forming the oxide film (see [0118])-[0019]) and forming at least one channel region comprising a portion of the doped semiconductor film see [0121])-[0124]), wherein the material including hydrogen is used as the ion source for the impurity ions (see [0118])-[0019]).

Zhang et al. also discloses the method wherein a gate insulating film (5) is formed over the semiconductor film after doping, and forming a gate electrode (6) over the gate insulating film.

Zhang et al. further discloses the method wherein in the doping step a material gas is at least on selected from the group consisting of diborane, phosphine, arsine and those obtained through dilution thereof with hydrogen (see [0118])-[0119]).

Zhang et al. does not disclose the method of forming a chemical oxide film is formed by treatment with ozone water, hydrogen peroxide or by ozone treatment through ultraviolet irradiation in an atmosphere containing oxygen. Ohtani et al. discloses a chemical oxide film is formed by treatment with ozone water, hydrogen

peroxide or by ozone treatment through ultraviolet irradiation in an atmosphere containing oxygen (see column 2, lines 44-46). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the oxide layer of Zhang et al. by the method of Ohtani et al. since it is a known alternative method of forming an oxide and as Ohtani et al. teaches this method improves the surface characteristics of the underlying film.

Ohtani et al. does not explicitly state that the pretreatment terminates dangling bonds on a surface of the semiconductor film with oxygen. However, as explained in the applicant's specification the termination of bonds in the present application occur with oxygen. The examiner points out that the pretreatment as taught by Ohtani to form the chemical oxide treats the surface of the substrate with oxygen (see column 2, lines 44-46), thus the pretreatment inherently terminates dangling bonds on the surface of the semiconductor film with oxygen.

Zhang et al does not disclose the method wherein a catalytic element of Ni, having the effect of accelerating crystallization is applied to the amorphous semiconductor film, and a heat treatment is conducted to form a crystalline semiconductor film. Ohtani et al. also discloses the method wherein a catalytic element of Ni, having the effect of accelerating crystallization is applied to the amorphous semiconductor film, and a heat treatment is conducted to form a crystalline semiconductor film (see column 7, lines 20-50). It would have been obvious to one of

ordinary skill in the art at the time the invention was made to apply a catalytic element of Ni to the amorphous silicon film of Zhang et al. in order to accelerate the crystallization of the amorphous silicon film, thereby increasing throughput.

Zhang et al does not disclose the method wherein the semiconductor device could be a personal computer, video camera, a mobile computer, a goggle type display deice, a DVD player, a CD player, a portable telephone, a projector. Ohtani et al. also discloses the semiconductor device could be a portable computer (see column 1, lines 24-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the semiconductor device in a personal computer since the TFTs allow for a display with high information content at a high speed.

In re claims 23 and 27, Zhang et al. discloses the method of forming a semiconductor film comprising silicon (31), specifically amorphous silicon, over an insulating substrate (1), forming a oxide film (33) on a surface of the semiconductor film comprising silicon as a pretreatment, and doping the semiconductor film comprising silicon with impurity ions after forming the oxide film (see [0118]-[0019]), patterning the semiconductor film to form at least on active layer after doping(see [0121]), forming a gate insulating film (5) over the active layer after patterning the semiconductor film and forming a gate electrode (6) over the semiconductor film with the gate insulating film interposed therebetween.

Zhang et al. does not disclose the method forming a chemical oxide film (see column 6, lines 55-64), wherein the chemical oxide film is formed by a treatment with at least one material selected from the group of ozone water and a hydrogen peroxide solution (see column 6, lines 60-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the oxide layer of Zhang et al. by the method of Ohtani et al. since it is a known alternative method of forming an oxide and as Ohtani et al. teaches this method improves the surface characteristics of the underlying film.

Zhang et al does not disclose the method wherein the semiconductor device could be a personal computer, video camera, a mobile computer, a goggle type display device, a DVD player, a CD player, a portable telephone, a projector. Ohtani et al. also discloses the semiconductor device could be a portable computer (see column 1, lines 24-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the semiconductor device in a personal computer since the TFTs allow for a display with high information content at a high speed.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (703) 308-6171. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



jmk  
June 29, 2003



John F. Niebling  
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